

CLAIMS

We claim:

1. A method of making a multilumen catheter assembly, comprising:
forming a unitary catheter tube to have a distal portion and a
distal end portion terminating in a distal end, a proximal portion terminating in a
proximal end, and a first lumen and a second lumen, each of the first lumen and the
second lumen extending longitudinally through the unitary catheter tube; and
splitting the unitary catheter tube longitudinally along the distal
end portion of the unitary catheter tube to form a first distal end tube and a second
distal end tube.
2. The method according to claim 1, further comprising grinding and
polishing the first and second distal end tubes to provide a generally smooth exterior
surface to each of the two distal end tubes.
3. The method according to claim 2, further comprising grinding and
polishing the first and second distal end tubes on a mandrel to shape the first and
second distal end tubes to have a generally circular transverse cross sectional
configuration.
4. The method according to claim 1, further comprising forming the
unitary catheter tube by a heat molding process.
5. The method according to claim 4, wherein the heat molding process
is extrusion.
6. The method according to claim 1, further comprising forming the
unitary catheter tube such that the unitary catheter tube has a cross sectional
configuration which is generally oval.
7. The method according to claim 1, further comprising forming the
unitary catheter tube such that the first and second lumens of the unitary catheter tube
are substantially identical in transverse cross section.
8. The method according to claim 7, wherein the first and second
lumens have a generally circular transverse cross section.

9. The method according to claim 1, further comprising forming a plurality of holes through an exterior surface of the first distal end tube and through an exterior surface of the second distal end tube.

10. The method according to claim 1, wherein the first distal end tub has
5 a length which is less than a length of the second distal end tube, the lengths being measured in a longitudinal direction.

11. The method according to claim 1, further comprising providing a first extension tube in fluid communication with a proximal end of the first lumen and a second extension tube in fluid communication with a proximal end of the second
10 lumen.

12. The method according to claim 11, further comprising providing a hub having at least a first passageway and a second passageway extending therethrough which connects the proximal end of the unitary catheter tube to the first and second extension tubes such that the first passageway is in fluid communication with the first
15 lumen and the first extension tube and the second passageway is in fluid communication with the second lumen and the second extension tube.

13. The method according to claim 12, wherein the hub is formed by heat molding and the method further comprises inserting a first rod in the first extension tube and in the first lumen such that the first lumen is spaced from the first
20 extension tube, inserting a second rod in the second extension tube and in the second lumen such that the second lumen is spaced from the second extension tube, molding the hub around the rods such that the hub encloses the proximal end of the unitary catheter and connects the proximal end of the unitary catheter to the first and second extension tubes, and removing the first rod and the second rod after forming the hub.

14. The method according to claim 13, wherein the hub is molded to have proximally extending projections formed around distal ends of the first and second extension tubes to divert the first and second extension tubes away from each other.

15. A method of making a multilumen catheter assembly, comprising:

arranging a first catheter having a distal end, a distal end portion
and at least one first lumen extending longitudinally therethrough and a second catheter
having a distal end, a distal end portion and at least one second lumen extending
longitudinally therethrough such that the first catheter and the second catheter are
5 substantially longitudinally parallel; and

forming an outer layer around at least a portion of an exterior
surface of the first catheter proximal to the distal end portion of the first catheter and
around at least a portion of an exterior surface of the second catheter proximal to the
distal end portion of the second catheter such that first catheter and the second catheter
10 are fixed within the outer layer, the first lumen and the second lumen are generally
parallel within the outer layer and the distal end portions of the first and second
catheters extend outwardly and distally from the portions of the exterior surfaces of the
first and second catheters which are within the outer layer and the distal end portions
are capable of independent movement.

16. The method according to claim 15, wherein the outer layer is heat
molded around at least a portion of the exterior surface of the first catheter and around
at least a portion of the exterior surface of the second catheter.

17. The method according to claim 16, wherein the first and second
catheter are in juxtaposed relation within the outer layer.

18. The method according to claim 15, wherein a proximal end portion
of the first catheter and a proximal end portion of the second catheter extend
proximally from a proximal end of the outer layer and a hub is provided around the
proximal end of the outer layer and around a section of the proximal end portions of
the first and second catheters adjacent the outer layer.

19. A method of making a multilumen catheter assembly, comprising:
forming a unitary catheter tube to have a distal portion and a
distal end portion terminating in a distal end, a proximal portion terminating in a
proximal end, and a first lumen and a second lumen, each of the first lumen and the
second lumen extending longitudinally through the unitary catheter tube;

forming a first distal end tube having a first passageway extending longitudinally therethrough and a second distal end tube having a second passageway extending longitudinally therethrough; and

5 attaching the first and second distal end tubes to the distal end of the unitary catheter tube such that the first passageway in the first distal end tube is in communication with the first lumen of the unitary catheter tube and the second passageway in the second distal end tube is in communication with the second lumen in the unitary catheter tube.

20. A multilumen catheter assembly, comprising:

10 (a) a unitary catheter having an exterior surface and a first lumen and a second lumen extending longitudinally therethrough, a distal end and a proximal end; and

15 (b) a first distal end tube defining a first longitudinally extending passageway and a second distal end tube defining a second longitudinally extending passageway, wherein the first and second distal end tubes extend distally from the distal end of the unitary catheter, the first passageway in the first distal end tube is in fluid communication with the first lumen, the second passageway in the second distal end tube is in fluid communication with the second lumen and the first and second distal end tubes are capable of independent movement with respect to each other.

20 21. The multilumen catheter assembly according to claim 20, wherein the first and second distal end tubes are generally circular in transverse cross section.

22. The multilumen catheter assembly according to claim 20, wherein the unitary catheter is generally oval in transverse cross section.

25 23. The multilumen catheter assembly according to claim 20, wherein the first and the second lumens are generally circular in transverse cross section.

24. The multilumen catheter assembly according to claim 20, wherein the first distal end tube has a length which is less than a length of the second distal end tube, wherein the lengths are measured in a longitudinal direction.

25. The multilumen catheter assembly according to claim 20, further comprising a first extension tube in fluid communication with the first lumen and a second extension tube in fluid communication with the second lumen.

5 26. The multilumen catheter assembly according to claim 25, further comprising a hub formed around the proximal end of the unitary catheter and around distal ends of the first and second extension tubes.

27. The multilumen catheter assembly according to claim 26, wherein the hub is configured to divert the distal ends of the extension tubes away from each other.

10 28. The multilumen catheter assembly according claim 20, further comprising a connector and a clamp releasably attached to each extension tube.

29. The multilumen catheter assembly according to claim 20, further comprising a plurality of holes formed through each of the first and second distal end tubes to provide fluid flow from outside the first and second distal end tubes into the passageways in the first and second distal end tubes.

30. The multilumen catheter according to claim 20, further comprising a first distal end opening in the first distal end tube and a second distal end opening in the second distal end tube.

31. A method for inserting a multilumen catheter assembly into an area of a body to be catheterized, wherein the multilumen catheter assembly comprises a unitary catheter having an exterior surface and at least a first lumen and a second lumen extending longitudinally therethrough, a distal end and a proximal end; and at least a first distal end tube defining a first longitudinally extending passageway and a second distal end tube defining a second longitudinally extending passageway, wherein the first and second distal end tubes extend distally from the distal end of the unitary catheter, the first passageway in the first distal end tube is in fluid communication with the first lumen, the second passageway in the second distal end tube is in fluid communication with the second lumen and the first and second distal end tubes are capable of independent movement with respect to each other, the method comprising:

30 (a) making an incision near the area to be catheterized;

(b) inserting the first and second distal end tubes through the incision and into the area to be catheterized until the first and second distal end tubes are fully within the area to be catheterized and a portion of the unitary catheter extends into the area to be catheterized; and

5 (c) securing the proximal end of the unitary catheter.

32. The method according to claim 31, wherein step (c) further comprises securing the proximal end of the unitary catheter in a subcutaneous tunnel.

33. The method according to claim 31, further comprising inserting the first and second distal end tubes into the area to be catheterized through a catheter
10 introducer sheath.

34. The method according to claim 31, further comprising inserting the catheter assembly into the area to be catheterized over a guide wire.

35. The method according to claim 31, further comprising closing the incision.